
Decreased Risk of Graft Failure with Maternal Liver Transplantation in Patients with Biliary Atresia.

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Public Summary:

Pregnancy is a unique situation in which a semi-foreign graft (the fetus) is naturally tolerated by its host (the mother). There are several theories to explain why this immunological tolerance exists. One such theory is that bidirectional cellular trafficking exposes the fetus to maternal cells early in gestation. As a result of this bidirectional passage of cells, the fetus becomes tolerant to maternally derived proteins. This normally occurring biological process may have implications for tolerance after solid organ transplantation. We investigated the rates of graft failure and retransplantation after parental liver transplantation in pediatric recipients with biliary atresia (BA), a disease with high levels of maternal cells that cross into the fetus. We found that BA patients had superior outcomes if they received a liver from their mother compared to their father. Our data supports the concept that maternal cells in BA recipients promote tolerance specifically to maternal proteins. This information may be important when counseling BA patients and their parents regarding liver transplantation.

Scientific Abstract:

The presence of maternal cells in offspring may promote tolerance to noninherited maternal antigens (NIMAs). Children with biliary atresia (BA) have increased maternal cells in their livers, which may impact tolerance. We hypothesized that patients with BA would have improved outcomes when receiving a maternal liver. We reviewed all pediatric liver transplants recorded in the SRTR database from 1996 to 2010 and compared BA and non-BA recipients of maternal livers with recipients of paternal livers for the incidences of graft failure and retransplantation. Rejection episodes after parental liver transplantation were examined for patients transplanted at our institution. BA patients receiving a maternal graft had lower rates of graft failure compared to those receiving a paternal graft (3.7% vs. 10.5%, $p = 0.02$) and, consequently, fewer episodes of retransplantation (2.7% vs. 7.5%, $p = 0.04$). These differences were not seen among non-BA patients or among BA patients who received female deceased donor grafts. In patients transplanted at our institution, paternal liver transplantation was associated with an increased incidence of refractory rejection compared to maternal liver transplantation only in BA. Our data support the concept that maternal cells in BA recipients promote tolerance to NIMAs and may be important in counseling BA patients who require liver transplantation.

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